

What is claimed is:

1. A stator assembly, comprising:
 - a housing;
 - a flux ring disposed within the housing;
 - a plurality of permanent magnets disposed around an inner surface of the flux ring; and
 - a material overmolded around the plurality of magnets to secure the magnets to the flux ring and to secure the flux ring to the housing.
2. The stator assembly of claim 1, wherein the flux ring includes anchors extending radially inward with the plurality of permanent magnets disposed between the anchors.
3. The stator assembly of claim 1, wherein the flux ring includes a seam that allows the flux ring to be compressed for insertion into the housing during assembly, the overmold material expanding the flux ring against the housing.
4. The stator assembly of claim 3 wherein the seam of the flux ring is filled with the overmold material during molding of the overmold material, the overmold material upon hardening preventing the flux ring from compressing.

5. The stator assembly of claim 3 wherein the stator assembly has a plurality of magnetic poles, the seam of the flux ring aligned with one of the magnetic poles.

6. The stator assembly of claim 3, wherein one of the flux ring and the housing includes at least one projection and the other of the flux ring and the housing includes at least one hole, the projection being received in the hole to align the flux ring in the housing.

7. The stator assembly of claim 6, wherein the projection and hole of the flux ring and housing are disposed about ninety degrees from the seam of the flux ring.

8. The stator assembly of claim 1, further including at least one of a rear bearing support, front bearing support and fan baffle integrally formed of the overmold material during molding of the overmold material.

9. The stator assembly of claim 1, further including a rear bearing support integrally formed of the overmold material during molding of the overmold material, the rear bearing support including a cap having a pocket therein for receiving a rear bearing.

10. The stator assembly of claim 1, wherein the overmold material is a plastic.

11. The stator assembly of claim 1, wherein at least one keying feature is formed in the overmold material between magnetic poles of the stator assembly.

12. The stator assembly of claim 11 wherein the keying feature includes slots formed in the overmold material between the magnetic poles with widths of at least two of the slots being different.

13. The stator assembly of claim 1, wherein the plurality of magnets includes four magnets, the stator assembly having a first magnetic pole defined by two of the magnets that are adjacent to each other and a second magnetic pole defined by the other two of the magnets that are adjacent to each other, the overmold material molded to have a first slot between the magnets of the first and second magnetic poles on a first side of the flux ring and a second slot between the magnets of the first and second magnetic poles on a second side of the flux ring that is diametrically opposed to the first side of the flux ring, the first and second slots having different widths.

14. A stator assembly comprising:

a housing;

a flux ring disposed within the housing, the flux ring having a seam that allows the flux ring to be compressed for insertion into the housing during assembly;

a plurality of permanent magnets disposed around an inner surface of the flux ring, each magnet disposed between at least two anchors extending radially inwardly from an inner surface of the flux ring; and

a material overmolded around the plurality of magnets to secure the magnets to the flux ring, to secure the flux ring to the housing by expanding the flux ring against the housing and to prevent the flux ring from compressing by filling the seam of the flux ring.

15. The stator assembly of claim 14 wherein one of the flux ring and the housing includes at least one projection and the other of the flux ring and the housing includes at least one hole in which the at least one projection is received, the seam of the flux ring aligned with a first magnetic pole of the stator assembly.

16. The stator assembly of claim 15 wherein the projection and hole of the flux ring and housing disposed about ninety degrees from the seam of the flux ring.

17. The stator assembly of claim 15 wherein the projection and hole of the flux ring and housing are aligned with a second magnetic pole of the stator assembly.

18. The stator assembly of claim 14, wherein at least one keying feature is formed in the overmold material between magnetic poles of the stator assembly, the keying feature including slots formed in the overmold material between magnetic poles of the stator assembly when the overmold material is molded with widths of at least two of the slots being different.

19. A stator assembly comprising:

- a housing;
- a flux ring disposed within the housing;
- a plurality of permanent magnets disposed around an inner surface of the flux ring;
- a material overmolded around the plurality of magnets to secure the magnets to the flux ring; and
- at least one of a rear bearing support, front bearing support and fan baffle integrally formed of the overmold material during molding of the overmold material.

20. A power tool comprising:
a housing; and
a motor disposed within the housing and having an output coupled to a transmission, the motor having a stator assembly having a flux ring disposed within a stator housing, a plurality of permanent magnets disposed around an inner surface of the flux ring, and a material overmolded around the plurality of magnets to secure the magnets to the flux ring and secure the flux ring to the stator housing.

21. The power tool of claim 20, wherein the flux ring includes anchors extending radially inward and each of the plurality of permanent magnets is disposed between at least two of the anchors.

22. The power tool of claim 20, wherein the flux ring includes a seam that allows the flux ring to be compressed for insertion into the housing during assembly of the stator assembly, the overmold material expanding the flux ring against the stator housing.

23. The power tool of claim 22 wherein the seam of the flux ring is filled with the overmold material that prevents the flux ring from compressing.

24. The power tool of claim 22 wherein the seam is aligned with a magnetic pole of the stator assembly.

25. The power tool of claim 20, wherein one of the flux ring and the housing includes at least one projection and the other of the flux ring and the housing includes at least one hole in which the projection is received to align the flux ring in the housing.

26. The power tool of claim 25, wherein the projection and hole of the flux ring and housing are disposed about ninety degrees from the seam of the flux ring.

27. The power tool of claim 25, wherein the stator assembly includes at least one of a rear bearing holder, front bearing holder and fan baffle integrally formed of the overmold material during molding of the overmold material.

28. The power tool of claim 25, wherein the overmold material is a plastic.

29. The power tool of claim 20, wherein at least one keying feature is formed in the overmold material between magnetic poles of the stator assembly, the keying feature including slots formed in the overmold material between the magnetic poles when the overmold material is molded with widths of at least two of the slots being different.

30. A method for constructing a permanent magnet stator assembly comprising:

inserting a flux ring having a plurality of anchors extending radially inward into a housing;

inserting a plurality of permanent magnets between the anchors;

injecting a material around the permanent magnets in the flux ring so that the material at least partially overmolds the permanent magnets to secure the permanent magnets to the flux ring and expand the flux ring against the housing to secure the flux ring to the housing.

31. The method of claim 30, wherein the flux ring includes a seam that allows the flux ring to be compressed and inserting the flux ring into the housing includes compressing the flux ring before inserting into the housing, inserting the flux ring into the housing while the flux ring is compressed and allowing the flux ring to expand against the housing once it has been inserted into the housing.

32. The method of claim 31, and further including preventing the flux ring from compressing by injecting the material so that it fills the seam of the flux ring, the material hardening in the seam and preventing the flux ring from compressing.

33. The method of claim 30, further including aligning the flux ring in the housing by inserting the flux ring in the housing so that a projection in one of the housing and flux ring extends into a hole in the other of the flux ring and the housing.

34. The method of claim 30, further including injecting the material so that it forms at least one of a rear bearing holder, a front bearing holder and a fan baffle.

35. The method of claim 30, further including injecting the material to form at least one keying feature by forming slots in the material between magnetic poles of the stator assembly with widths of at least two of the slots being different.

36. The method of claim 30, and further including preassembling the housing and flux ring as a unit by:

stamping the housing and flux ring from separate blanks, the separate blanks each stamped to have interlocking fingers on opposed ends;

stamping at least one hole in one of the housing and flux ring blanks and stamping at least one projection in the other of the housing and flux ring blanks;

laying the housing and flux ring blanks together with the at least one hole and the at least one projection engaging each other; and

rolling the housing and flux ring blanks so that the fingers of the housing blank interlock and the fingers of the flux ring blank interlock.

37. The method of claim 36 and further including spot-welding the flux ring and housing together.

38. The method of claim 30, and further including preassembling the housing and flux ring as a unit by:

rolling the flux ring from a blank; and

rolling the housing from a blank where the housing blank is rolled around the flux ring with the flux ring acting as a rolling arbor.

39. The method of claim 38 wherein one of the flux ring and housing blanks is stamped to have at least of one projection and the other of the flux ring and housing blanks is stamped to have at least one hole therein, the at least one projection engaging the at least one hole during the rolling of the housing blank about the flux ring.

40. The method of claim 38 wherein the flux ring and further including spot-welding the flux ring and housing together.